

Current Biochem Investment Climates in Europe

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Investors are seeking opportunities in large, fast growing markets driven by clear consumer demand. In addition they prefer business fields with strong industries for later exits. All these criteria are true for the emerging investment fields in the European BioEconomy. This term sums up all investment opportunities into the new value chain starting from sustainable raw materials to the four magic F-products: Food, Feed, Fibers and Fuel. This value chain asks for new feedstock, new processing technologies and results in new products as well. It involves agri- and silviculture producing renewable carbon sources such as sugar, plant oil and biomass, ii) industries emitting carbon, hydrogen and organic side streams, iii) providers of processing and engineering technologies, iv) plant construction and v) consumer industries.

One of the most attractive sectors is the chemical industry providing i) fine- and specialty chemicals like pharmaceuticals, food- and feed- additives and hygienic products, ii) bulk chemicals such as mono- and polymers (e.g. polyethylene) as well as iii) commodities (e.g. isobuten). Already today 13% of the chemical production is based on sustainable carbon sources and till 2025 this segment is expected to double. While fine and specialty chemicals maintain the biggest bio-based category, monomers and commodities are expected to catch up fast by an annual growth rate of 10%. When considering the global market of plastics of about 250 million tonnes the enormous investment opportunity becomes obvious. Braskem produces bio-polyethylene from sugar cane, Dupont starts with corn-starch to 1,3-propane-diol (1,3-PDO) and Evonik Industries provides bio-polyols and bio-polyamides. In addition to these successfully launched examples consumers ask for more bio-based products to reduce their daily life carbon footprint. Consequently Henkel launched green product lines and Coca Cola publishes in its Corporate Responsibility Report the carbon balance of the materials their bottles are made of.

Thus, consumers and consumer industries push the European BioEconomy. However, responding to this consumer demand needs processes and technologies which either do not belong to the chemical industry's traditional tool set or are not yet available at all. This is the business opportunity for start-ups because big industry needs partners in developing enzymatic and whole-cell catalysts, in bio-process engineering, in bio-product separation and purification as well as in designing the interface of bio-catalysis and chemical synthesis. Examples are the investments of Lanxess into the US start-up Gevo

targeting bio-isobuten from corn and the joint development of Goodyear and Genencor (now Danisco) to bio-rubber. While these examples address products known to nature the just emerging synthetic biotechnology will give access to biological intermediates which are engineered to meet specific industrial demands. The above mentioned 1,3-PDO is only an early example for such bio-products. They will offer a sustainable alternative to chemical precursors made from fossil carbon sources and capture a significant share of this high-volume market.

Even more science-fiction-like technologies become investment opportunities. Who could imagine to produce chemicals from CO₂-emission some years ago? In Germany the energy giants RWE and EON are working on feeding algae with the carbon-emission from their power plants and RWE cooperates with BRAIN in enzymatic carbon fixation. The New Zealand start-up Lanzatech just started a pilot plant at the Chinese steel maker BAO to produce ethanol from waste-gases by biotechnological transformation and the US-Department of Energy (DOE) provides a grant to make jet-fuel from that ethanol. At the same time Lufthansa is the first airline to test bio-jet-fuel on commercial flights between Frankfurt and Hamburg. This example demonstrates not only the use of a so far not considered carbon source but also the build-up of a new value-chain linking steel-making, the fuel-industry and airlines in the frame of the BioEconomy. It shows not only that industries which have never been connected to each other develop business relations but also that the technology provider facilitating this new relation is an innovative start-up. Now is the time for investors to identify the European BioEconomy's new business opportunities and help to realize them.

As on the one hand the BioEconomy business models are early and need to proof their sustainable profitability on the other the investment approval might be made easier by the fact that the chemical industry will be a financially sound partner for exits. A representative example is provided by Dupont who shortly acquired Danisco including the biotech veteran company Genencor.

In that case the investor is a big company who knows in detail i) the feedstock and chemical markets, ii) the cost-driving processing steps, and iii) the trends in science and technology driving the BioEconomy. Such a company is able to define a solid financial evaluation through its in-house intelligence. However, the fund-raising start-up as well as the venture capital company (VC) looking for investment opportunities is mostly in a different situation. While they may see more clearly the future opportunities of their visionary technology or product they are not so much integrated in the daily industrial business. They often miss the in-depth view on the whole value chain, on the real value-adding process-steps and on the market-channels. Therefore start-ups and investors depend much more on external networks providing the intelligence they need to identify suitable providers of capital,

future market opportunities, and – even more critical – judge their value. Because of its disruptive character the unfolding BioEconomy is very much accelerated by modern clusters embracing not only big industries, innovative start-ups and science-pushing academic institutions but also established and new value chains. Industry, start-ups and investors are well advised to use the accumulated cluster-wisdom to identify and evaluate investment opportunities. The time is right in Europe to capture the BioEconomy's business potential and as always first movers will catch the competitive advantage!

Europe Unlimited is a partner within the BIOCHEM project and the person to contact is [Arno Nurski](#).